HRT2141- Principles of Horticultural Crops Production

Department of Plant and Soil Sciences (Horticultural Sciences)

University of Venda

Lecture 1_ Horticultural context

1. The nature of Horticulture

What is horticulture – the science and art involved in marketing, processing, cultivation and propagation of horticultural crops and management of horticultural enterprises. Horticulture incorporates the art and principles of design.

Horticulture involves improving plant growth, overall quality, and yield through plant propagation and appropriate cultivation techniques, with aesthetics playing a major role in plant care. The purpose of growing horticultural crops includes food, medicine, ornamentals, aromatic properties, and the wine industry.

This leads to different fields within horticulture, such as floriculture, viticulture, olericulture, arboriculture, pomology, and oenology which are the study, of cultivation, and marketing of flowers, grapes, vegetables, trees, fruits, and wine, respectively.

Horticultural practices have expanded to incorporate plant pathology and entomology, where diseased or pest-infected plants may be treated quickly, as well as soil science, in order to improve plant production by reducing environmentally stressful conditions.

This field has also evolved to include various techniques that have been used to obtain new cultivars, including genetic engineering.

2. Characteristics of horticultural crops

i. Intensively cultivated
ii. High value (rands and nutrients)
iii. Highly perishable
iv. Postharvest practices of horticultural crops are much more difficult and expensive (hand harvesting, packhouse activities, refrigeration, transport).

3. Importance of Horticulture

3.1 Economic impact
3.2 Employment generation
3.3 Export potential
3.4 Foreign exchange earnings
3.5 Market diversification
3.6 Food and nutritional contribution
3.7 Medicinal value
3.8 Aesthetic - Improve the appearance of homes and buildings through landscaping. Improve the appearance of the land, ornamentals
3.9 Environmental benefits - Provide health and comfort by cleaning the air, preventing erosion, and providing shade

3.10 Family income supplementation
3.11 Wasteland utilization
3.12 Religious and cultural significance
3.13 Industrial input

4. The role of Horticulture in sustainable agriculture

i. Environmental conservation – it promotes practices that minimize the negative impact of agriculture on the ecosystem. This is achieved through reduced water usage, and chemical inputs and encourages biodiversity by adopting sustainable horticultural techniques.

ii. Economic growth – The horticulture industry contributes significantly to the economy by generating employment opportunities and fostering rural development. The Horticulture industry was estimated at 108 billion in 2022, representing 27.9% of total agriculture sales (DALRRD, 2023). Countries can stimulate economic growth while ensuring food security by investing in horticultural practices and reducing dependence on imports.

iii. Nutritional security - Horticulture provides a wide range of fruits and vegetables that are rich in vitamins, minerals, and antioxidants. These promote a healthy and balanced diet, thereby ensuring nutritional security.

5. Opportunities in Horticulture

i. Innovation and technology – The horticulture industry has been revolutionized by advancing technology, enabling efficient and sustainable practices. Hydroponics and vertical farming are precision agriculture techniques that maximize resource utilization and minimize environmental impact. These innovative approaches allow all-year-round production, independent of weather conditions, and provide opportunities for urban farming and community-supported agriculture.

ii. Localised food production - Supporting local farmers and growers strengthens the domestic economy and reduces the carbon footprint associated with long-distance transport. The reduction of dependence on imports and enhancing self-sufficiency in food production.

iii. Consumer awareness and demand

6. Challenges for Horticulture in South Africa

6.1 Market volatility
6.2 Limited cold chain structure
6.3 Labour shortage
6.4 Small-scale farmer challenges
6.5 Water scarcity
6.6 Poor infrastructure
6.7 Pest and disease
6.8 Climate change impacts
6.9 Loadshedding
6.10 Rising input costs
6.11 Non-tariff barriers: Compliance with sanitary and phytosanitary standards in different markets

7. Opportunities for Horticulture in South Africa

7.1 Export potential
7.2 High-value crops
7.3 Technology adoption
7.4 Market diversification
7.5 Value addition
7.6 Skills development
7.7 Sustainable farming

8. Scope of horticulture

i. Diverse Agro-Climatic Conditions: South Africa has diverse climatic conditions, which include tropical, subtropical, and temperate regions, which allow the production of different horticultural crops.

ii. Nutritional demand: The recommended minimum intake of fruits is 85g, and for vegetables, it is 200g. Therefore, there is a need to expand horticultural production to meet the nutritional requirements of the growing population.

iii. Transportation: Efficient transport networks are essential for the distribution of perishable horticultural products, thereby enhancing market access for farmers and improving the supply chain for consumers.

iv. Environmental Protection: It contributes to environmental sustainability. Horticulture enhances biodiversity through the cultivation of plants, improves soil health, and aids in carbon sequestration, thereby mitigating climate change challenges.

v. International Trade Opportunities: Horticulture enhances the country foreign exchange earnings through exports.

vi. Raw Material Supply for Industries: Horticulture plays a pivotal role in supplying raw materials to various industries, and food processing sectors such as canning and dehydration. This link to industry enhances the agricultural economy but also promotes rural development.

8. Types of Horticulture

8.1 Pomology - It deals with fruit production, with the main focus on the development, improvement, cultivation, and physiology of fruit trees. The objective of fruit tree enhancement is to improve **fruit quality while decreasing harvest time and production costs.**

1.1.1 Viticulture - It deals with the production of grapes.
1.1.2 **Citriculture** – oranges, lime, grapefruit, tangerines,
1.1.3 **Deciduous fruit**- apples, pears, plums, apricots, nectarines, prunes,

8.2 Olericulture - It deals with growing vegetables, with the main focus on the establishment of crops, choosing cultivars, seed bed preparation, propagation (direct seeding or transplanting), and preservation. In addition, it also deals with conventional and unconventional methods of growing vegetables which include hydroponics and biotechnology, it also includes organic gardening, sustainable horticultural, and agricultural practices.

8.3 Ornamental horticulture - It focuses on production of flowers and other decorative plants for use in landscaping and floral arrangements. It deals with the cultivation of plants and flowers for decorative

purpose, as well as leafy green for fresh bouquets. The bulk of the florist work also include development new plant strains through breeding.

8.3.1 Floriculture - flower and foliage plant culture and production

8.3.2 Florist – floral design and retail florist operation

8.3.3 Nursery production – tree, shrubs, vine culture and production

8.3.4. Landscape horticulture - The main objective of landscape horticulture is to achieve ecological, social-behavioural, and aesthetic goals through the planning, construction and design of exterior and interior space, sights, and buildings.

8.4 Turf management - The process of growing and caring for grass specifically for use in recreational and aesthetic purposes. This includes grasses for lawns, landscape, sports facilities.

8.5 Postharvest physiology - The scientific investigation of the physiology of plant tissue after harvest, to maintain quality, delay senescence, and extend shelf life.

8.6. Plant propagation - The science and art of plant multiplication.

8.7 Speciality crops - This includes crops such as herbs, spices, beverages, and medicinal plants

8.9 Arboriculture - It deals with the cultivation and management of single shrubs, vines, trees, and other different perennial woody plants. It examines how trees and other plants mature and change in response to human influence.

9. How the Horticulture Sub-sector is organized in South Africa

The horticulture sub-sector is comprised of fruit and nut farmers, vegetable farmers, ornamental horticulturalists, wine producers, produce packers, produce processors, and produce exporters. The main fruits produced in South Africa are grapes, oranges, lemons, apples, avocados, and mangoes, while the major vegetables are potatoes, tomatoes, onions, and cabbages.

In production Horticulture decreased by 0.8%, due to decrease in the production of subtropical fruits (guavas, mangoes, avocadoes, litchis, bananas and pineapples), as well as deciduous fruits (apricots and apples) and production of dried fruits and nuts.

The horticultural sector grew by 5.8%, reaching a total of R147,740 million compared to R139 604 million in 2023/2024. However, field crops saw a total decrease of 13.8%, dropping from R124,889 million to R107,629 million. The reason for the growth and decrease of horticultural crops and field crops respectively, are listed in Table 1. The total combined income for these two sectors in 2024/2025 stands at R255,369 million.

Table 1: Crops which contributed to the increase and decrease in gross income of horticultural and field crops, respectively

Horticultural crops		
Product Category	**Change (%)**	**Trend**
Citrus Fruit	+12.8%	Strong growth
Deciduous & Other Fruit	+5.5%	Growth

Vegetables	+1.3%	Stable
Viticulture	-2.2%	Slight decrease
Subtropical Fruit	-6.9%	Decrease
Field crops		
Crop Type	**Change (%)**	**Impact Level**
Sunflower Seed	-78.0%	Severe
Maize	-23.0%	High
Cotton	-23.0%	High
Wheat	-9.5%	Moderate
Sugar Cane	-4.6%	Low
Grain Sorghum	-2.9%	Minor
Barley	-2.4%	Minor

9.1 Who are the key role players in the Horticulture sub-sector?

Unions and sector representatives

1. The Fresh Produce Exporters Forum
2. Citrus Growers Association
3. HORTGRO
4. South African Nursery Association (SANA)
5. Institute for Landscape Architecture in South Africa (ILASA)

Research and Development

1. SASTI
2. Subtropical Fruit Growers Association
3. Fruit South Africa
4. Wine tech
5. Agricultural Research Council (ARC)

10. Key skills drivers in Horticulture

There are 11 skills change drivers that are currently propelling change in the Horticulture sub-sector, namely

1. Civil and political unrest,
2. Industry transformation,
3. Land reform and rural economic development,
4. New technology (4IR),
5. Compliance,

6. Policy uncertainty,
7. Decline of infrastructure,
8. Resource management and optimisation.
9. Youth development and gender empowerment,
10. Succession planning imperatives and
11. Climate change, pests and diseases.

11. SWOT Analysis for the South African horticulture industry

STRENGTH	WEAKNESSES
• Well-developed commercial farming industry. • Well established distribution channels through supermarkets, fresh produce markets, exports, and processor: ○ A well- developed retail sector, and linkage to the rest of Sub-Saharan Africa. • Significant exporter of high-value fruit. • Counter-seasonality to key export markets. • Strong government and private support. • Strong research and development. • Steadily increasing processing capacity.	• Highly susceptible to disasters such as drought and consequently the climate crisis. • Phytosanitary systems are adequate but could be improved to facilitate exports. • Concerns about electricity and transport interruptions, especially impact on cold chain. • Concerns about working conditions, which may affect exports. • Very difficult for small farmers to get into formal value chain.
OPPORTUNITIES	**THREATS**
• Growth in exports to Asia and Middle East. • Technological innovation driving efficiency in production and marketing. • Increased demand for healthy foods. • Snackification opens an opportunity for dried fruits. • Supplying private label ranges for major retailers • Increased support for smallholders and upgrading in labour conditions to improve socio-political context in South Africa and overseas. • Strengthen irrigation, off-grid solar power systems and other measures to improve resilience to climate change and loadshedding.	• Unstable electricity supply. • Increasingly stringent export regulations in the EU markets: ○ Food safety and phytosanitary restrictions may affect exports of food products and certain food ingredients. • Inefficiencies at ports are a significant constraint on the export of value-added goods. • Rising costs for petroleum and fertilisers. • Overall food inflation means consumers substitute lower-cost products. • Climate change. • Security of water supply and water quality from local authorities which could impact production. • Lose support from government due failure to expand representativity and smallholder production, and to improve conditions for workers. • Rising minimum wage and other labour costs.

Source: TIPS, 2024

References

1. Agiseta. Horticulture. 2024 https://www.agriseta.co.za/wp content/uploads/2023/09/Agriseta_Horticulture_.pdf. Accessed 13 February 2025
2. https://www.agribook.co.za/citrus-fruit/
3. Badal, S., Byfield, G. and Brown, M.C., 2017. Chapter 3: Areas of science embraced by pharmacognosy: constituent sciences of pharmacognosy. Pharmacognosy, pp.31-44.
5. Dubois, T., Nordey, T. and Opara, U.L., 2019. Unleashing the power of vegetables and fruits in Southern Africa. In Transforming Agriculture in Southern Africa (pp. 170-178). Routledge.
6. Key Deciduous Fruit Statistics 2024. https://www.hortgro.co.za/markets/key-deciduous-fruit-statistics/ Accessed 10 February 2026
7. CGA-Key- Industry Statistics 2025. https://www.citrusresourcewarehouse.org.za/home/document-home/information/cga-key-industry-statistics/10536-cga-key-industry-statistics-2025. Accessed 10 February 2026
8. Rather, A.M.U.D., Hajam, M.A., Bhat, M.S.A. and Malik, M.I., 2023. Horticulture: Principles and practices. Academic Guru Publishing House. pp. 1-6
9. Trade & Industrial Policies Strategies (TIPS). 2024. Horticulture Value Chain.www.tips.org.za Accessed 13 February 2025.
10. Trends in the Agricultural Sector. 2025. https://www.dalrrd.gov.za/images/Branches/Economica%20Development%20Trade%20and%20Marketing/Statistc%20and%20%20Economic%20Analysis/statistical-information/trends-in-the-agricultural-sector-2023.pdf Accessed 10 February 2026